

Application No. 08/499,423

surface would be inherently present in the prior art product. Okita or Kowligi anticipates or strongly suggests the claimed subject matter.

Id. This position does not withstand scrutiny.

The current rejection is premised on the unjustified proposition that different laser treatments of different PTFE surfaces must necessarily produce the same product. The PTFE processing employed by the Okita et al. patent and the Kowligi et al. patent, while certainly both using lasers of some form, are in no way similar to the processing steps of the present invention. These two prior laser treatments will render PTFE surfaces completely different from the surface taught and claimed in the present application.

The claims of the present invention are directed to PTFE surfaces with particular unique structures. Claim 1 (twice amended) defines a node and fibril PTFE microstructure having node clusters interconnected by fibrils and gnarled nodes that protrude from the surface being substantially devoid of fibrils along the protruding length. Similarly, claim 2 (twice amended) also defines a PTFE having node clusters interconnected by fibrils and gnarled nodes having a protruding length and being substantially devoid of fibrils along the protruding length. Claim 10 (twice amended) defines a similar structure wherein the protruding length of a node substantially devoid of fibrils along its protruding length is greater than the height of adjacent node cluster ridges.

In order to produce these claimed structures, the present inventor determined that an unfocused laser should be applied to a PTFE surface that was previously expanded to achieve a node and fibril microstructure. Application, at 11, lines 17-21 ("The focusing, or final lens set, is removed, resulting in an 'unfocused' laser beam having an approximate diameter of about 2.5 mm (0.1")"). Unfocusing the laser beam is directly contrary to the normal operation of the laser apparatus. As is noted in the present application, "... the removal of the focusing lenses eliminates the highly focused, convergence of the beam, which is normally used in cutting or welding applications." Id., at 11, lines 19-21. It is through this modification of the laser treatment apparatus that the present invention removes the fine fibril structures attached to the nodes without volatilizing the nodes themselves. Only by removing the fibrils without destroying the nodes can the claimed invention of protruding "gnarled" nodes be produced. Additionally, the unfocused laser beam used in the present invention produces enough energy to retract the fibers in the adjacent expanded PTFE structure, producing node clustering, without being so strong so as to degrade the surrounding material.

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The processes of the Okita et al. and Kowligi et al. patents simply cannot create the present invention as claimed.

The Okita et al. patent teaches using a laser to volatilize the nodes and fibrils of an expanded PTFE surface. In this regard, Okita et al. specifically teach using a focused laser beam:

The surface of the outermost layer of each of the hollow fibers was thermally decomposed by scanning with a CO₂ laser (100 watts) beam obtained by focusing with a lens system consisting of a condenser, reflector and a conical mirror. By this physical treatment, not only were the fiber portions cut but the nodes forming the porous surface were also volatilized.

Col. 6, lines 1-7 (emphasis added). In contrast to the highly roughen surface achieved by the present invention, Okita et al. teach that a laser should be used when a very smooth surface texture is desired. Col. 2, lines 63-65 ("If a very fine texture with a roughness of about several micrometers is desired, lasers or Rf energy is preferably used." (emphasis added)); col. 6, lines 11-13.

Thus the Okita et al. patent teaches using focused laser energy to create a very fine expanded PTFE surface. Nothing in that patent in any way teaches or suggests that the lens system of the laser should be removed in order to create a macroscopically rough surface. In fact, Okita et al. expressly teaches that such lens systems should be used. Moreover, the Okita et al. patent is devoid of any teaching or suggestion that an unfocused laser beam applied to an expanded PTFE surface would produce the unique protruding gnarled nodes and node clusters taught and claimed by the present invention. The present invention as claimed is simply not "inherently present" in the Okita et al. patent.

The Kowligi et al. patent is even further removed from the present invention. Kowligi et al. teaches that PTFE can be treated with a laser prior to expansion of the PTFE. See, e.g., Col. 2, lines 19-20 ("The foregoing objects are achieved in the invention in which a PTFE sheet is knurled prior to expanding." (emphasis added)); col. 4, line 65 to col. 5, line 2 ("... a laser can pattern a sheet by weakening selected areas of a sheet prior to expansion or can sinter (strengthen) selected areas of a sheet prior to expansion." (emphasis added)). When PTFE is treated in this manner prior to expansion, any nodes formed in a subsequent expansion step will have fibrils attached to them. Thus, the protruding nodes taught and claimed in the present application simply will not be produced using the process of Kowligi et al. Nothing in the Kowligi et al. patent in any way teaches or suggests the present invention as claimed.

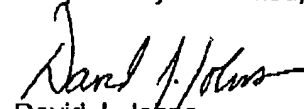
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In summary, neither of the two cited references in any way teaches or suggests the present invention as claimed. Contrary to the assertion made in the current Office Action, these patents do not employ the same laser process taught in the present application. As a result, the allegation that the claimed structure of the present invention is "inherently present" in the products of Okita et al. or Kowligi et al. patents is unsupported. Nothing in any of the references of record in any way teaches or suggests the node clusters and protruding freestanding gnarled nodes of the present invention. Moreover, none of the cited references suggests modifying laser apparatus to create an unfocused laser beam in order to achieve the unique expanded PTFE surface of the present invention.

Conclusion

Accordingly, each of claims 1 (twice amended), 2 (twice amended), 3 (amended), 4 (amended), 5-7, 10 (twice amended), and 12-27 is new and non-obvious over all of the cited references. Applicant respectfully requests reconsideration and allowance of all of the claims in the present application. If any questions remain, applicant requests an interview before issuance of the next Office Action.

Respectfully submitted,



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